NOVA SCHOOL OF BUSINESS & ECONOMICS

**MASTER IN FINANCE**

# "LUFTHANSA AG"

# INDIVIDUAL REPORT

*"AIRLINE GROUP"*

03 JANUARY 2020

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A Work Project presented as part of the requirements for the Award of a master's degree in finance from the NOVA – School of Business and Economics.

Lufthansa AG – Individual Report – Distance flown per aircraft analysis

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Abstract

Due to the supply driven business driver model, the inherit inputs contain demand implications, which needed to be checked and in line with the projected expectations of our model. The parameter distance flown per aircraft have the highest share price sensitivity and decreased recently from 3.35 to 2.62 in 2 years (-22%). Two important circumstances had an effect on the development of this parameter: Lufthansa´s recent acquisitions of short-haul airlines, as well as a drop-in fleet utilization rate. In the further, different scenarios will be discussed to make the model consistent with our overall projections and expectations in terms of Lufthansa´s business model and fleet utilization rate in order to project the most likely scenario for the revenue forecast.

Keywords (up to four):

- Lufthansa
- Airline
- Individual Report
- Distance flown per aircraft

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**Distance flown per aircraft - analysis**

**Introduction**

In order to give deeper insides on Lufthansa's equity report, it is advisable to conduct several sensitivity analyses on important factors affecting the valuation model. In this case, sensitivity factors can be further divided in financial and operating. Regarding the financial factors, it can be stated that adjusting factors while using cashflows from the original valuation model might result in inconsistencies. Since financial factors, such as capital costs etc. are stemming from financial theory, an adjustment of own expectations would lead to inconsistencies in the model. It is therefore advisable to investigate using a sensitivity analysis for the assumptions in the business model of the company itself. Thus, the most important factors are incremented in the revenues of the valuation, as most parts are linked to the projected revenues and the size of the fleet forecast. Using a supply driven revenue forecast approach, it is crucial to analyse the airline specific operating metrices in order to forecast the revenue precisely.

As visible in the spreadsheet "revenue mind map" (see **Graphic 6**) of the valuation model, the network airline revenues are mainly driven by several factors, which are mostly constant such as passenger load factor and average flights per plane per year. On the other hand, some factors such as average fare price per passenger and average seats per plane have suddenly changed in the last 2 years. One possible explanation for these are the recent acquisitions of Air Berlin and Brussels airline, which shifted the incremented factors in the airline revenues towards more short-haul flights instead of long-haul flights. Since future M&A activity can hardly be prognosticated, these most recent value can most likely be seen as best fitting magnitudes for our revenue forecast. Nevertheless, there is one factor which is heavily driven by uncertainty, which is the distance flown per aircraft. As presented in **Graphic 1**, there is a dramatic decrease in this factor from 2014 to 2018 by -20,4%, whereas the airline revenues increased by 15,8%. As previously stated, due to the acquisitions of Air Brussels and Air Berlin Lufthansa's fleet increased during the past years alone through the Air Berlin acquisition by 40 aircrafts.[1] In general there might be several opposite factors regarding the effect of these acquisitions on the kilometre flown per aircraft per year.

On the first hand, the number of aircrafts increased just recently after what these aircrafts might not be fully integrated in Lufthansa's operation. In this case, it should be assumed, that the number of distances flown per aircraft would bounce back to its original number of above 3,3 million kilometres in the future. On the other hand, the bought aircrafts (Airbus A320 family) are part of Air Berlin's short and medium-haul fleet and are therefore assumed to fly less kilometres

[1] https://onemileatatime.com/lufthansa-airberlin-planes-takeover/

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per year due to higher total maintenance time. This scenario would imply a shift in the business model of Lufthansa to lower term flights. This hypothesis will be analysed later in this report, as it is not clear whether this is true or just intuition.[2]

In a 3rd possible scenario, both factors are not decisive and the real reason for the decrease of this factor is a decrease in the demand of customers toward Lufthansa's operations resulting in a lower utilization rate for Lufthansa's fleet. This is possible, since the presented revenue split and forecasting method is supply and not demand driven by assuming several fixed factors and letting the revenues grow or decline by the future number of aircrafts, which Lufthansa is planning to order and surrender in the future. Since Lufthansa is planning on decreasing their fleet, it seems that Lufthansa is already reacting on a possible future decrease in demand. In order to show the influence of both effects, **Graphic 2** and **Graphic 3** present the sensitivity of a small shift in future kilometres flown per aircraft to its share price.[3] Thus, an increase (decrease) of 4,4% (-4,8%) result in a decrease of share price by 43% (-43%) assuming a fuel price growth rate of 1,84%.[4] Having such a high impact on the valuation model underlines the importance of this factor. However, there is no clear evidence how the distance flown per aircraft will move in the future and it was therefore conducted to get better insides from Lufthansa's peers.

**Competitor analysis**

As presented in **Graphic 4,** comparable data of competitors were used to find evidence for industry standards. Thus, the average seat kilometres flown (ASK) per aircraft are around 435 kilometres per aircraft (in mio.) and Lufthansa has currently ASK per aircraft of around 460 mio. kilometres **(Graphic 5).** The distance flown per kilometre of the peer group is around 2,86, which is slightly higher than Lufthansa with 2.62. Having a stable ask per aircraft, the increase in average seats per aircraft adjusted for the decrease in distance flown per aircraft.

$$ASK\ per\ aircraft = * \frac{Distance\ flown\ per\ aircraft\ *\ Average\ seats\ per\ aircraft}{Passenger\ Load\ Factor\ (in\ \%)}$$

Having a stabile load factor of around 80%, this would intuitively support the previously mentioned idea of a shift in business model to more short-haul flights. In order to investigate this, **Graphic 4** shows the average seats per aircraft and the distance flown per aircraft for other airlines. The correlation between both metrices is negative ($\rho = -0.73$), which means that the average seats per aircraft and distance flown per aircraft are negatively correlated. This means exactly the opposite; long-haul flights airlines tend to have lower distance flown per aircraft and vice versa as

[2] https://www.alternativeairlines.com/airbus-a320
[3] Appendix: Graphic 4
[4] https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=14&ved=2ahUKEwjas6bJ7P_kAhWCDewKHVm-BLkQFjANegQIBhAC&url=https%3A%2F%2Fwww.eia.gov%2Foutlooks%2Faeo%2Fexcel%2Faeotab_12.xlsx&usg=AOvVaw3KIqY84-STylp6SvQ1gt3Q

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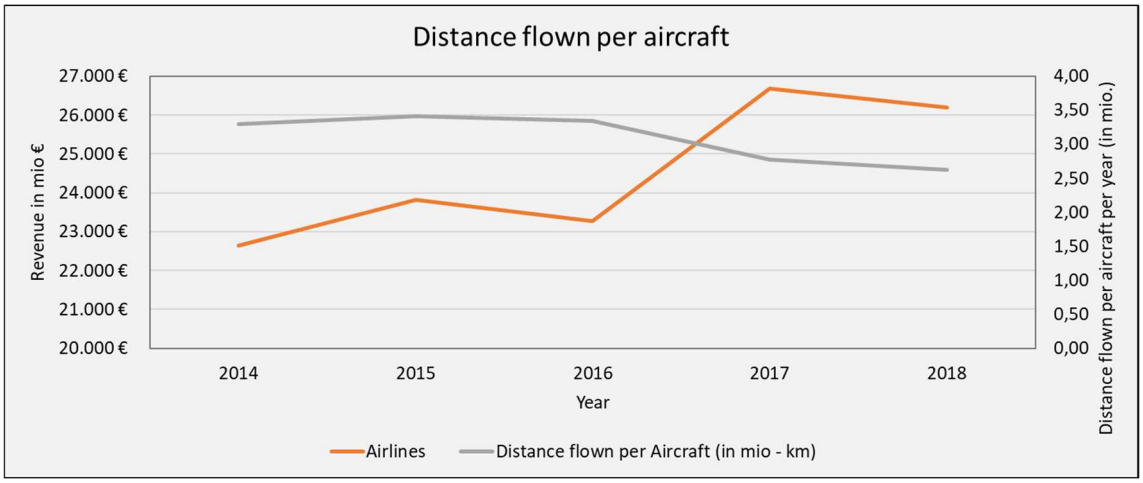
long-haul aircrafts have higher seats per aircraft. It would also mean that even though there was a drop in distance flown per aircraft, the shift in business model to more short-haul airlines must have had a positive effect on distance flown per aircraft As a logical consequence, the drop in distance flown per aircraft must be explained by a lower utilization rate of their fleet, which might have been even overbalanced the opposite effect from their shift to more short-haul flights. This would also explain why the company is planning to reduce their fleet size drastically, in order to increase utilization rate again.

**Conclusion / Forecast**

Regarding the discussed facts and scenarios of development for this parameter and by already assuming a decrease in Lufthansa's fleet in the future from 763 to 652 in 2025, it is assumed that this metrics is going to stabilize around the last years value of 2,62. Lufthansa is currently slightly below the peer group average. Furthermore, it is reasonable, that Lufthansa is not going to purchase over-proportional amounts of aircrafts for its short and medium-haul business, since the aircraft forecast does not show this and the main reason for the Air Berlin purchase was the relative cheapness of Air Berlins assets for Lufthansa. Additionally, the short and medium-haul flight business of Lufthansa (Germanwings, Air Brussel) are under high pressure from other competitors, such as Ryanair [5], which does not support the fact that Lufthansa would invest over-proportional into its short and medium-haul flight business. Further airline acquisitions on the European domestic market might push this metrics a bit higher, but potential acquisitions are not predictable by now and have to be incorporated in the model separately.

**Appendix**

**Graphic 1:**




[5] https://onemileatatime.com/eurowings-brussels-airlines-branding/

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**Graphic 2:**

| Share Price - DCF (in Euro per Share) | | Fuel Price growth (in %) | | | | |
|---|---|---|---|---|---|---|
| | **35.09** | 1% | 1.50% | 1.84% | 2.50% | 3% |
| Distance flown per Aircraft (in mio. km) | 2.5 | 28.60 | 24.64 | 21.84 | 16.16 | 11.59 |
| | 2.56 | 35.30 | 31.33 | 28.54 | 22.88 | 18.36 |
| | 2.62 | 41.86 | 37.88 | **35.09** | 29.44 | 24.93 |
| | 2.68 | 48.32 | 44.31 | 41.51 | 35.84 | 31.34 |
| | 2.74 | 54.68 | 50.65 | 47.82 | 42.12 | 37.61 |

**Graphic 3:**

| Share Price - DCF (Change in %) | | Fuel Price growth (in %) | | | | |
|---|---|---|---|---|---|---|
| | **35.09** | 1% | 1.50% | **1.84%** | 2.50% | 3% |
| Change in distance flown per aircraft in % | 4.8% | -18% | -30% | -38% | -54% | -67% |
| | 2.3% | 1% | -11% | -19% | -35% | -48% |
| | 0.0% | 19% | 8% | 0% | -16% | -29% |
| | -2.2% | 38% | 26% | 18% | 2% | -11% |
| | -4.4% | 56% | 44% | 36% | 20% | 7% |

**Graphic 4:**

| | ASK | RPK | Load Factor (in%) | Airplanes | Passenger | ASK per aircraft | Distance flown per aircraft | Available seats per aircraft |
|---|---|---|---|---|---|---|---|---|
| AAL US Equity | 453.9 | 372.2 | 82% | 940 | 204 | 482.9 | 1.94 | 248.8 |
| DAL US Equity | 423.8 | 362.4 | 85% | 912 | 193 | 464.7 | 2.06 | 225.7 |
| UAL US Equity | 443.0 | 370.3 | 84% | 790 | 158 | 560.7 | 2.97 | 189.0 |
| LUV US Equity | 257.2 | 214.5 | 83% | 750 | 130 | 342.9 | 2.20 | 155.9 |
| 1055 HK Equity | 314.4 | 259.2 | 82% | 847 | 130 | 371.2 | 2.35 | 157.7 |
| 600115 CH Equity | 244.8 | 201.5 | 82% | 692 | 121 | 353.8 | 2.41 | 147.0 |
| RYA ID Equity | 184.4 | 177.0 | 96% | 450 | 140 | 409.7 | 2.81 | 145.8 |
| 601111 CH Equity | 273.6 | 220.5 | 81% | 669 | 102 | 409.0 | 3.23 | 126.6 |
| THY AO TI Equity | 182.0 | 149.1 | 82% | 347 | 75 | 524.6 | 5.73 | 91.6 |

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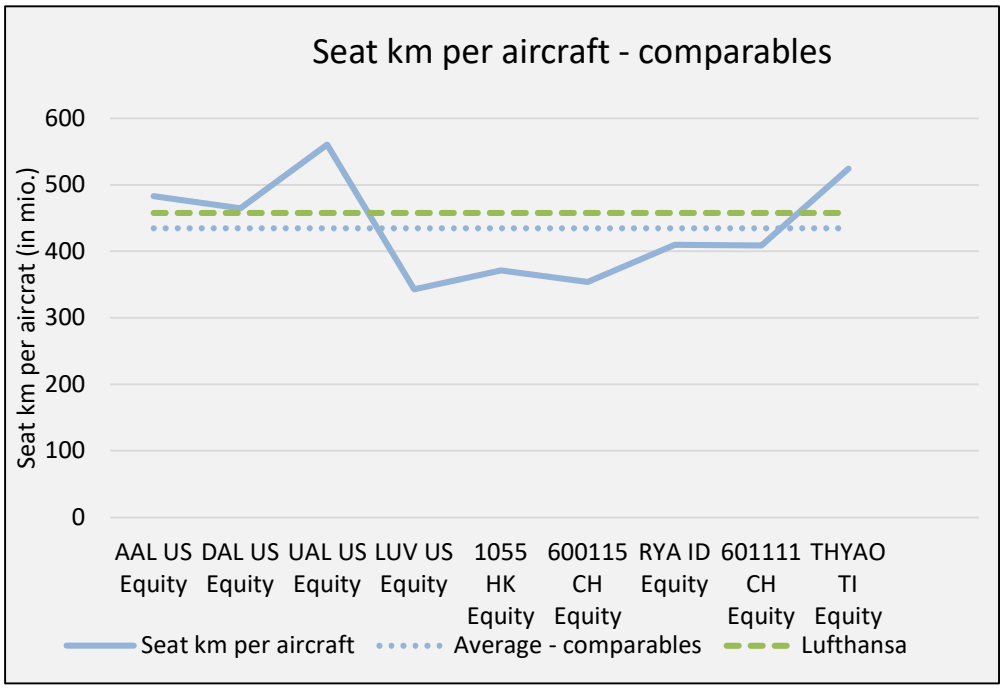
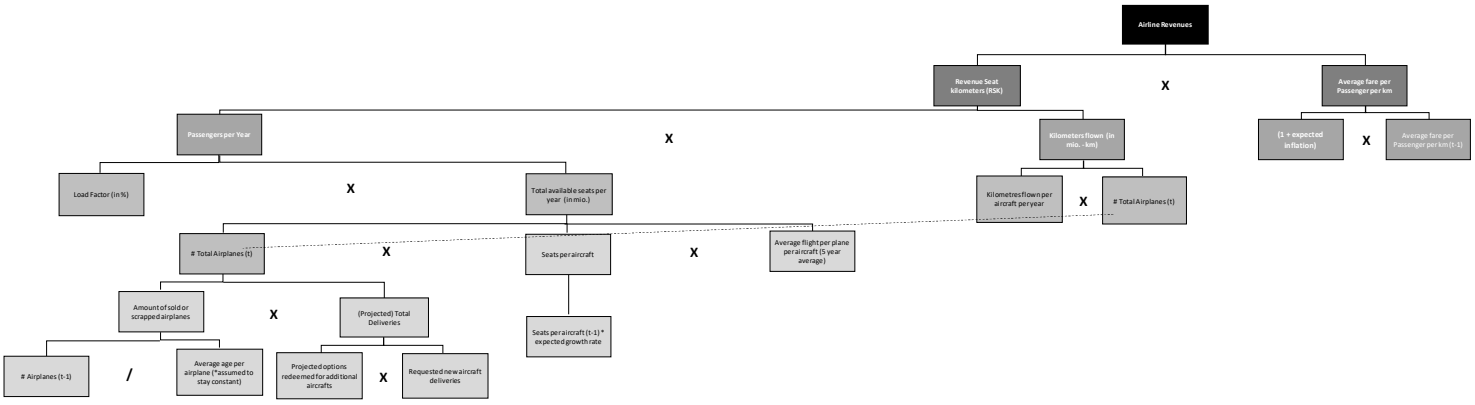
**Graphic 5:**




**Graphic 6:**




*Recommended Zoom: 300%*